tion can be obtained from the Education Officer (T/3), L.C.C. Education Offices, Victoria Embankment, W.C.2.

The Marquess of Crewe, chairman of the governing body of the Imperial College of Science and Technology, was present, with other distinguished guests, at the ninth annual dinner of old students of the Royal College of Science on Saturday last, April 24. Sir Richard Gregory, president of the Old Students' Association, who occupied the chair, in proposing the toast of the governing body, said that the time had come for a national survey of the conditions and requirements of university and higher technical education in this country, so that a comprehensive view could be taken of the problem as a whole, existing deficiencies discovered, and adequate educational facilities provided in all areas. The Imperial College would take an important place in any national scheme which might result from such a survey. Lord Crewe, in responding to the toast, said that the college was not content to be merely a school of any university, however distinguished. Though there was in this country no precedent for a technical university, there was, on the other hand, none for a population of eight millions, which was the population of Greater London, with but one university to serve all purposes. The problem of the reorganisation of the University of London was quite enough in itself, without involving the infinitely more difficult task of trying to combine in some way the activities of the University and of the Imperial College in one entirely unprecedented unit. At any rate, the governors of the Imperial College had made up their minds that the problem had to be solved in a way which assured their practical independence. Sir W. H. Bragg spoke of the increased interest, due mostly to the war, now taken in scientific studies, resulting in overfilled laboratories in university institutions and insufficient instructors. Mr. Herbert Wright gave instances of purely scientific investigations at the college which had proved of great practical value, and Prof. J. C. Philip referred to the steps being taken to provide a worthy war memorial to old students. Prof. H. E. Armstrong, proposing the toast of "The Guests," paid a tribute to the men of science whose work contributed so largely to success in the war; and Sir Richard Glazebrook, in responding, referred particularly to the work of Mr. L. Bairstow, Dr. G. W. C. Kaye, and Mr. F. E. Smith, old students of the college, at the National Physical Laboratory.

Societies and Academies.

LONDON.

Linnean Society, April 15.—Dr. A. Smith Woodward, president, in the chair.—Capt. F. Kingdon **Ward**: Natural history exploration on the north-east frontier of Burma.—R. **Paulson**: Stages in the sporulation of gonidia within the thallus of the lichen, *Evernia prunastri*, Ach. It has for a considerable time been generally accepted that the bright-green spherical gonidium which is common to many lichens, and is referred to in the literature of the subject as Cystococcus, Protococcus, or Pleurococcus, multiplies vegetatively only, while it remains the algal constituent of the lichen thallus. Famintzin (1868), Baranetzki (1868), Woronin (1872), Bornet (1873), and Chodat (1913) state that the gonidia (Cystococcus?) of certain lichens produce zoospores after being isolated from the gonidial layer and afterwards cultivated in, or on, different media. The author has not been able to find that the gonidia of *Evernia prunastri*, and of twenty-three other species of lichens, representing eleven genera, divide vegetatively within the thallus, but in all these cases the reproduction of gonidia was found to be the result of the successive bipartition of the original protoplast of the cell into four, eight, or sixteen separate masses, each of which rapidly develops a cell-wall of its own while within the mother-cell. These daughter gonidia (suppressed zoospores?) ultimately escape as the mother cell-wall becomes diffluent. They exhibit all the characteristics of the parent cell before they are set free.

Royal Anthropological Institute, April 20.—Sir Everard im Thurn, president, in the chair.—R. Grant **Browne**: The races of the Chindwin, Upper Burma. The basin of the Chindwin, in the north-west of Burma, is of exceptional interest to ethnologists on account of the medley of peoples inhabiting it—peoples distinguished from each other by their language and customs rather than by their physical characteristics. They include Burmans, Shans, Tamans, Chins, Nagas, Kachins, and Kadus. These terms denote communities rather than races, for the inhabitants may change from one group to another in the course of a few years. The people of Maukkalauk, for instance, are now regarded as Kachins, but have learnt Shan, and will, no doubt, "become" Shans like their neighbours, and eventually Burmans; but their head-man says they left Assam, where they wore white clothes and spoke some language, of which they have forgotten even the name, when his father was a boy. In contrast to this process of assimilation there are mountain tribes living a few miles apart from each other whose dialects have been differentiated until they have become mutually unintelligible. The more civilised communities owe their language and customs to a succession of dominant races. The Burmese came last. Before them were the Shans, and before these probably the Kadus. There are signs that Kadu, now almost extinct in this area, was once the prevailing language of the riverine tracts.

Royal Meteorological Society, April 21.—Mr. R. H. Hooker, president, in the chair.—**Royal Observatory, Greenwich**: A night sky recorder. The object of the instrument is to supplement the daily sunshine record in so far as it gives an indication of the amount of cloud. The instrument consists of a small camera in a fixed position pointing to the pole of the heavens. The lens is a single component of a doublet of 8-in. focal length and 0·4-in. aperture, working at *f*/20. It is found that the aperture, in conjunction with plates of "ordinary" speed, will give a good record even at full moon. Measurements are made by means of a photographic scale.—Lieut. N. L. **Silvester**: Local weather conditions at Mullion, Cornwall. The author gave a detailed analysis of the local meteorological elements in the order of their importance relative to airship navigation, but remarked that the period under review (approximately one year) was too short to deduce much information of climatological value, though during most of this period the observations were as full and as frequent as the changes of the Service in war-time would permit. Ratios of gradient to surface wind had been computed and analysed from the results of more than 400 pilot-balloon ascents by the one-theodolite method. There was evidence of the marked friction and turbulence affecting the wind near the surface in the vicinity of large buildings, such as airship-sheds. Much useful information relating to the local occurrence of fogs and of unusual visibility had been tabulated; whilst another feature was the collection in tabular form of local signs of approaching bad weather, which should prove of value to the local forecaster.—J. E. **Clark**: The Surrey hailstorm of July 16, 1918. This storm differed from other similar British visitations by the fortunate absence of much wind and by coming after midnight. The track of serious damage rarely exceeded ½ mile in width and was 16½ miles long, the hail beginning at 1.55 a.m. west of Holmwood Station and ending near North Bromley Station, twenty-two miles to the north-east, at about 2.30 a.m. (true time).

EDINBURGH.

Royal Society, March 15.—Prof. F. O. Bower, president, in the chair.—Capt. T. Bedford **Franklin**: The effect of weather changes on soil temperatures. In comparison with the variations of surface temperature, the regular pulsations of temperature in the soil follow well-known laws for amplitude and retardation according to depth, but in these regular pulsations there are fluctuations which occur according to the weather and the state of the soil. If the ratio of the ranges of temperature at the 4-in. depth and the surface be taken as the standard for measuring the heat transfer in the soil, it is found that in a light loam soil this range-ratio varies between 0·19 and 0·42 when active percolation is not taking place in the soil, and between 0·42 and 0·85 when rain is actually falling or during those long-period weather changes associated with the passage of depressions north of these islands, whether rain falls or not. Heat transfer in soil is thus carried out by both conduction and percolation, and a sandy soil that allows free percolation, with consequent high values of the range-ratio, will heat up quicker in spring than a clay soil which takes up and parts with water only sluggishly. Apart from percolation, the high values of the range-ratio in the south-westerly cyclonic type of weather are particularly valuable in causing rapid rises of soil temperature in spring. A surface layer of frozen soil protects the lower depths from rapid changes of temperature; an average surface temperature of −10° C. would be necessary to freeze ordinary soil to a depth of 4 in. in one night. Snow is an even more efficient protection; in November, 1919, the air temperature above 4 in. of snow fell to −15° C. without freezing the soil surface or causing any appreciable fluctuation in the temperature 4 in. beneath the surface of the soil.—D. **Ferguson**: Geological observations in the South Shetlands, the Palmer Archipelago, and the Danco coast, Grahamland.—G. W. **Tyrrell**: A contribution to the petrography of the South Shetlands, the Palmer Archipelago, and the Danco coast, Grahamland.—H. H. **Thomas**: Petrographical notes on rocks from Deception Island and Roberts Island (South Shetlands), the Danco coast, and adjacent islands, Grahamland. These papers contained a great many new facts regarding the geology and petrography of the rocks in the islands named lying to the south of South America. In a broad sense, the geological arrangement might be described as a mirror reflection of the arrangement on the South American coast, and it was probable that the two sets of strata were connected by an arc passing east, and then bending round to the south and to the west, but there was no evidence in support of Suess's theory that this arc extended far to the east so as to include the South Georgian group.—Miss C. W. N. **Sherriff**: A class of graduation formulæ.—Prof. L. **Becker**: The daily temperature curve. In this paper the author developed a new mathematical method of treating the variation of temperature, and illustrated it by a discussion of a forty years' photographic record of temperature in Glasgow.

DUBLIN.

Royal Dublin Society, March 23.—Dr. F. E. Hackett in the chair.—Prof. James **Wilson**: The application of the food-unit system to the fattening of sheep. A summary of experiments in fattening sheep was published by Mr. Herbert Ingle in the Transactions of the Highland and Agricultural Society of Scotland for 1910 and 1911. From this it is evident that the sheep differs from the bullock by being better able to consume roots, and, therefore, less dependent upon hay and straw. The sheep is also considerably more economical as a producer of human food; for, while the well-fed bullock of average size—say 9 cwt.—needs from six to seven food units to produce a pound of beef—a food unit is the quantity of any other food which would have the same producing capacity as a pound of barley—a well-fed sheep of average size—say 120 lb.—produces a pound of mutton on five to six food units.

Royal Irish Academy, April 12.—Mr. W. G. Strickland, vice-president, in the chair.—E. **Heron-Allen** and A. **Earland**: An experimental study of the Foraminiferal species *Verneuilina polystropha*, Reuss, and some others, being a contribution to a discussion on "The Origin, Evolution, and Transmission of Biological Characters." In this paper the authors describe normal and monstrous forms of *Verneuilina polystropha*. The species exhibits characteristic dimorphism in a long, tapering test which is megalospheric, and a short test which is microspheric, but in the dwarf variety, *pusilla*, the tapering test is microspheric. Observations on the selection by Verneuilina of fragments of heavy minerals, by mixing crushed gems with the sand in the experimental tanks with which the authors worked, are described. Variation in the shells of *Massilina secans* is also described in detail, one of the most remarkable "monsters" being a perfectly twinned specimen which had added a curved tube at the junction of the shells to form a common aperture; the whole of this abnormal shell was chitinous. In another case a shell was entirely chitinous except the terminal chamber, which was perfectly and normally calcareous. Further instances of shells combining the characters of two distinct genera—such as have been recorded in former papers by these authors—are given, and the opinion is expressed that the accepted systems of classification of the Foraminifera, founded as they are on the shape and material of the test, must be regarded as largely artificial and unscientific.

PARIS.

Academy of Sciences, March 29.—M. Henri Deslandres in the chair.—G. **Bigourdan**: The observatory of J. S. Bailly at the Louvre.—Prince Albert de **Monaco**: Stray mines in the North Atlantic. A chart is given showing the positions of sixty-eight mines located between November 7, 1918, and February 9, 1920. The predictions by the author in two earlier communications have been fully confirmed.—A. **Rateau**: Some considerations on flight at very high altitudes and on the use of a turbo-compressor. An adverse criticism of a recent communication on the same subject by M. Villey.—P. **Vuillemin**: The growth of fungi discovered in the human nail by Louis Jannin.—G. **Julia**: Families of functions of several variables.—H. **Mineur**: Discontinuous solutions of a class of functional equations.—B. **de Fontviolant**: The strength of circular arches.—F. **Kromm**: A star with a large proper motion. The star B.D.+9·2636°, 9·1 magnitude, has an annual proper motion of nearly a second of arc.—G. **Sagnac**: Newtonian light radiation and the zones of silence in damped wireless telegraphy signals.—M. **Pauthenier**: The ratio of the absolute retardations in Kerr's phenomenon.—M. **Lemarchands**: Study of the reactions of the metallurgy of zinc.

Zinc oxide is reduced by carbon in absence of oxygen (atmosphere of nitrogen) at temperatures between 850° C. and 1100° C. The amounts of carbon used in the reduction of zinc oxide in ordinary metallurgical practice are excessive.—P. **Nicolardot**, A. **Réglade**, and M. **Geloso** : The volumetric estimation of manganese. A study of the errors of Knorr's method.—F. **Gros** : Improvements relating to the commercial production of oxides of nitrogen in arc furnaces. The improvements described are the use of dried gases, increasing the amount of oxygen to 50 per cent., and the replacement of the alkaline absorption towers by a physical method, the separation of the nitrogen peroxide by cooling. The latter can be readily converted into nitric acid of any strength.—A. **Mailhe** : A new method of formation of nitriles by catalysis. Methyl benzoate and ethylamine, passed over alumina heated to 480°–500° C., gave benzonitrile. Paratoluic nitrile, *iso*amyl nitrile, and *iso*butyonitrile were prepared in a similar manner.—L. **Joleaud** : The presence of a Tomistoma in the fresh-water Pliocene of Ethiopia.—F. **Baldet** : The diurnal variation of the atmospheric potential at the Algiers Observatory. A discussion of five years' observations. The diurnal variation is represented by a simple oscillation having a constant minimum about 4 a.m. and a maximum variable with the season. The observations confirm the law of M. Chauveau.—P. **Girard** and V. **Morax** : Liquid exchanges by electrical osmosis through living tissues.—J. **Chaine** : The union of the paramastoid apophysis and of the temporal in mammals.—A. **Krempf** : The oro-aboral metamerisation of the larva of *Pocillopora cespitosa* and of *Seriatopora subulata*.

April 6.—M. Georges Lemoine in the chair.—G. **Rémoundos** : Increasing functions and entire functions.—P **Humbert** : A new application of the function $W_{k,p,\nu}(x, y)$—L. E. Z. **Brouwer** : Enumeration of the classes of transformations of the projective plane.—J. **Andrade** : Extension of conservative systems and a generalisation of a theorem of M. Painlevé.—Ch. **Fremont** : Cause of the undulatory wear of rails.—M. **Lecornu** : Observations on the preceding communication.—J. **Villey** and A. **Volmerange** : Hovering flight by a horizontal wind of invariable direction and velocity.—M. **Girousse** : The distribution in the soil of currents from electric traction lines.—P. **Job** and G. **Urbain** : The detection of masked sulphuric ions in complex compounds. The benzidine method of estimating sulphate ions is shown experimentally to possess advantages over the barium method. Examples are given of analyses of cobaltammine sulphates.—Ch. **Boulin** and L. J. **Simon** : The action of water on dichloroethyl sulphide. Using an excess of water at its boiling point, dichloroethyl sulphide can be completely decomposed, giving hydrochloric acid and thiodiglycol; the reaction is reversible.—P. **Fallot** : An extension of the phenomena of drift in the Sierra of Majorca.—G. **Dubois** : The Quaternary fauna of the base of the Ergeron at Cambrai.—L. **Besson** : The actinometers of Arago and Bellani. Details of the precautions necessary in the accurate use of these two instruments.—A. **Piutti** : The action of chloropicrin on the parasites of wheat and on rats. Large-scale experiments have proved the efficacy of chloropicrin in destroying wheat parasites, and it has also been demonstrated that the treated wheat is inoffensive and preserves its nutritive power. Chloropicrin has also been successfully employed in the destruction of rats in ships.—V. **Galippe** : Researches on the resistance of the microzymas to the action of time and their survival in amber.—G. **Bertrand** : The action of chloropicrin upon the higher plants. Under suitable conditions it is possible to use chloropicrin to free a plant from all its leaf parasites without killing the plant.

ROME.

Accademia dei Lincei, February 1.—A. Ròiti, vice-president, in the chair.—G. **Fubini** : Affine differential invariants of a surface.—Q. **Majorana** : Gravitation. This is the seventh note on the author's experimental attempts to detect the screening off of gravitation by massive sheets of matter (see NATURE for April 22, p. 251). The whole note is devoted to the search after, and the discussion of, "causes of error" or disturbing effects. These troublesome effects are now all estimated numerically, but, notwithstanding this, the author closes the present note, postponing the computation of the corrected value of the effect sought for to the next (viii.) note.—V. **Amato** : Kronecker's method for the decomposition of an integral rational function in an amplifield field of rationality.—P. **Scatizzi** : Abelian differential equations reducible to quadratures.—L. **Tonelli** : Primitive functions (ii.).—Clara **di Capua** : Investigations on alloys of Au and Si.—C. **Gorini** : A microbiological investigation of the behaviour of *Bacterium coli* in milk.

L. SILBERSTEIN.

Books Received.

Life of Lord Kitchener. By Sir George Arthur. 3 vols. Vol. i., pp. xxvi+326; vol. ii., pp. xi+346; vol. iii., pp. xi+413. (London: Macmillan and Co., Ltd.) 2*l*. 12*s*. 6*d*. net

Grain and Chaff from an English Manor. By A. H. Savory. Pp. viii+311. (Oxford: B. Blackwell.) 21*s*. net.

The Works of Aristotle. Translated into English. Œconomica. By E. S. Forster. Atheniensium Respublica. By Sir Frederic G. Kenyon. Unpaged. (Oxford: At the Clarendon Press.) 5*s*. net.

The Geography of Plants. By Dr. M. E. Hardy. Pp. xii+327. (Oxford: At the Clarendon Press.) 7*s*. 6*d*. net.

The Ways of Life: A Study in Ethics. By S. Ward. (London: Oxford University Press.) 6*s*. 6*d*. net.

Tungsten Ores. By R. H. Rastall and W. H. Wilcockson. Pp. ix+81. (London: John Murray.) 3*s*. 6*d*. net.

Microscopy: The Construction, Theory, and Use of the Microscope. By E. J. Spitta. Third edition. Pp. xxviii+537+xxviii plates. (London: John Murray.) 25*s*. net.

College Text-book of Chemistry. By W. A. Noyes. Pp. viii+370. (New York: H. Holt and Co.)

Diary of Societies.

THURSDAY, APRIL 29.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM (at Royal Society of Medicine), at 10 a.m.—J. B. Story: Presidential Address.—C. H. Usher: Enlarged Corneæ in Goldfish.—E. Treacher Collins: Megalo-cornea and Micro-cornea.—J. Rowan: Are not some Cases of Glaucoma Better Treated without Operation, and, if so, what are the Indications?—A. Zorab: Later Notes on Aqueoplasty.—T. Harrison Butler: Notes on Infection after Operations for Cataract.—G. H. Pooley: Abnormalities of the Lacrymal Apparatus and their Treatment.—G. Harvey Goldsmith: A Case of Double-Traumatic Dislocation of the Lens.—G. F. Alexander: (1) A Position of the Head Favourable to the Operation for Cataract; (2) An Operation for Advancement in Strabismus.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—R. Campbell Thompson: The Origins of the Dwellers in Mesopotamia.

ROYAL SOCIETY, at 4.30.—Prof. J. W. Gregory: The Irish Eskers.—Miss K. M. Curtis: The Life-History and Cytology of *Synchytrium endoboticum* (Schilb.) Perc., the Cause of Wart Disease in Potato.—B. Sahni: The Structure and Affinities of *Acmopyle pancheri*, Pilger.

ZOOLOGICAL SOCIETY OF LONDON, at 4.30.—Annual General Meeting.

CHEMICAL SOCIETY, at 5.—Extraordinary General Meeting to consider the Alterations in the By-laws proposed by the Council.

CHILD-STUDY SOCIETY (at Royal Sanitary Institute), at 6.—Sir A. E. Shipley: Biting Insects and Children.

INSTITUTION OF ELECTRICAL ENGINEERS (at Institution of Civil Engineers), at 6.—A. E. McColl: Automatic Protective Devices for Alternating Current Systems.

OPTICAL SOCIETY (at Imperial College of Science and Technology), at 7.30.—Dr. C. E. Kenneth Mees: The Reaction of the Eye to Light.